Western Kentucky Minerals
Daviess County, Kentucky
Joes Run South Mine Site
(830-0095)

ALTERNATIVES ANALYSIS

I. INTRODUCTION

The purpose of the proposed Joes Run South mine is to recover coal from properties owned and/or leased by Western Kentucky Minerals, Inc. and sell this resource to local and regional utilities. The proposed action is needed to meet the energy demands of the United States, as well as to stimulate the local economy. Western Kentucky Minerals must do this in a manner that returns a reasonable profit on investments in land and mineral rights, site development, infrastructure, and equipment while being environmentally responsible and complying with regulatory requirements. Pursuant to Section 404 (b) (1) of the CWA, the USACE defines the practicable alternatives as those that are "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose." The 404 (b)(1) guidelines generally prohibit the permitting of projects where there "is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences" 40 CFR 230.10. When a project is not water dependent, there is a presumption that practicable alternatives are available 40 CFR 230.10. There is also a presumption that any practicable alternative will have a lesser adverse effect on the environment unless clearly demonstrated otherwise 40 CFR 230.10. A project is water dependent if it "requires access or proximity to or sitting within the special aquatic sites to fulfill its basic purpose and is considered a non-water dependent activity".

Under NEPA, all reasonable alternatives must be rigorously explored and objectively evaluated as well as those other alternatives, which are eliminated from a detailed study. What constitutes a reasonable range of alternatives depends on the nature of the proposal and the facts of the application. Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint. In accordance with the requirements of NEPA and Section 404 (b)(1) guidelines, the applicant has provided the least damaging practicable alternative.

II. NON-PRACTICABLE ALTERNATIVES A. OFF-SITE

Alternate Sites

Use of alternate mine sites was eliminated for several reasons, most significantly relating to environmental impact, public safety, and economics. Most significant is the general rarity of mineable coal reserves in Daviess County. As underlying geology is out of the applicant's control and is the primary driver for mine site selection, a limited pool of potential sites exists. The potential sites were evaluated by exploratory geological core sampling, and low extraction ratios and substandard coal quality excluded several. Of the remaining sites, those other than the proposed Joes Run South site were significantly farther from the Yellow Banks River Terminal on the Ohio River and from Owensboro Municipal Utilities (the proposed site is only 10 miles from this facility). Thus, alternate sites would expose the public to more heavy truck traffic on public roads and potentially more emissions of fugitive dust and exhaust gases.

However, the primary consideration was the availability of minable coal that makes the project economically feasible and having the surface and mineral rights at Joes Run South.

B. ON-SITE

Alternate Mining Methods

Mining methods are reviewed on the basis of geography, geology, economics and surface/mineral rights control. Those methods for Kentucky are underground, auger/highwall, and surface area mining, potentially with combinations of two or more methods of mining. The applicant has evaluated each method, and variations of each, and has determined that underground mining is not practicable, leaving surface area mining and smaller sections of auger mining as the only available methods. As underground mining was eliminated from consideration, the applicant did not quantify potential stream impacts associated with underground mining methods but did for the surface area method.

Underground Mining

To determine the feasibility of utilizing the underground mining method, the applicant analyzed the Lewisport, Upper Whiteash, the Whiteash #1, the Whiteash #2 and the Leadcreek coal seams against a set of criteria established specifically for this method (**Table 1**). Mining method decisions

were based on geologic conditions, economic feasibility, miner safety, public safety, and potential ecological impact. Underground mining was considered but rejected due to seam thicknesses of only 24”-40” in the Lewisport seam, 20”-32” in the Upper Whiteash seam, 8”-12” in the Whiteash #1, 12”-18” in the Whitesh #2, and 30”-38” in the Leadcreek seam; seam thickness generally needs to average 42” for underground mining to be economically feasible. Additionally, inadequate overburden cover (less than 120 feet) exists for establishment of a stable roof. This would result in unsafe conditions for miners and potentially would lead to mine collapse and surface subsidence. Subsidence likely would have deleterious effects on streams above the mine area; dewatering or significant disturbance of local hydrology could lead to potential loss of jurisdictional waters through fractures in the overburden and enter mine voids below. Based on this analysis, the coal seams to be mined do not meet the criteria for underground mining and underground mining was eliminated as a practical alternative for these seams.

Table 1: Underground Mining Criteria

Coal Seam	Seam Height > 42"	Cover ≥ 100 ft	50% Recovery C/Miner
Lewisport	No	No	Yes
Upper Whiteash	No	No	Yes
Whiteash #1	No	No	Yes
Whiteash #2	No	No	Yes
Leadcreek	No	No	Yes

Auger/Highwall Mining:

To determine the feasibility of utilizing the Auger/Highwall Mining method, the applicant analyzed the Lewisport, Upper Whiteash, the Whiteash #1, the Whiteash #2 and the Leadcreek coal seams against a set of criteria established specifically for this method. Adequate seam thickness (>24”) and geologic conditions needed to provide sufficient subsidence support are fundamental criteria to be evaluated. There is insufficient cover and seam thickness to support auger or highwall

mining over the entire site, however, there are two locations where seam thickness is adequate to support auger mining. Auger mining is proposed along the western section of the permit boundary (16.5 acres) and in the northeast corner of the permit (31.5 acres).

III. PRACTICABLE ALTERNATIVES CONSIDERED

No-Action Alternative

The no-action alternative for the project was found to be unacceptable as it would not allow Western Kentucky Minerals to recover coal at the Joes Run South mine and deliver it to the marketplace. The local economy also would be adversely impacted by the loss of coal production. The projects located on Owensboro's "New Riverside" were funded from coal severance tax money, and the loss of this project would hinder future potential developments to the Owensboro area. The project would extend employment for forty-seven high-paying positions at the site and extend employment for fourteen positions at the existing barge loading facility, as well as trucker positions for transport, and three employees at the test laboratory. The average wage of the mine ($60,000 per year) nearly doubles the median personal income in the county and is 25% higher than the median household income. A total estimated $3.3 million in coal severance taxes and $400,000 in property and income taxes over the five-year life of the mine, would be lost to county, state, and federal collections if the applicant did not develop the site. A final consideration is the existence of contracts with several energy partners. Owensboro Municipal Utilities is expecting deliveries of coal from the Joes Run South mine. In addition to loss of revenue to Western Kentucky Minerals, electric power customers potentially face an increase in rates if these providers must find alternate sources of coal. Owensboro Municipal Utilities is the biggest consumer of WKM's produced coal and rely very heavy on locally mined coal found in this reserve. The reserve is the only reserve intact with over 1 million tons in the Knottsville area.

Impacts: None

Criteria for Exclusion: Does not meet project plan and purpose

Mining Between Aquatic Resources:

The geology and topography of the project area indicate that it will not be possible to totally avoid streams and still achieve a viable project. Mining between streams would significantly reduce the amount of recoverable coal and shorten the lifespan of the project making it a non-viable project.

Large equipment will be required to remove overburden and access the coal reserves. A 100-200-foot-wide buffer would be needed along each stream which would leave behind a significant amount of recoverable coal. Even if this method were economically feasible, streams within the permit boundary would be indirectly impacted. Stream hydrology would be altered by reducing precipitation run-off during mining and the immediate watersheds and drainage patterns would be affected long after mining.

Area Mining

To determine the feasibility of utilizing the area mining method basis, the applicant analyzed the Lewisport, Upper Whiteash, the Whiteash #1, the Whiteash #2 and the Leadcreek coal seams against a set of criteria established specifically for the area mining method (

Table 3). Under this alternative, area mining would allow full recovery (95%). For area mining to be practicable, each seam must meet the following:

Table 3: Area Mining Criteria

Coal Seam	Seam Height > 12"	Ratio ≤ 23.0	> 100,000 Mineable Tons	90% Pit Recovery
Lewisport	Yes	Yes	Yes	Yes
Upper Whiteash	Yes	Yes	Yes	Yes
Whiteash #1	Yes	Yes	Yes	Yes
Whiteash #2	Yes	Yes	Yes	Yes
Leadcreek	Yes	Yes	Yes	Yes

IV. PREFERRED ALTERNATIVE AND CONCLUSION

The mining method proposed for the Joes Run South Mine has been in use in Daviess County for over thirty years. With this preferred alternative, jurisdictional features will potentially receive a significant ecological lift over existing conditions by being held to current regulatory mitigation

standards. The majority of all streams within the permit have heavy agriculture influence, (channelization, heavy sedimentation, and reduced riparian zone). This agricultural influence will be reduced extensively through the creation of riparian buffers and isolating the majority of the mitigation from the impact area and from heavily farmed sites. Prior to disturbing individual watersheds to be mined, sediment control structures and diversion ditches are constructed to control all surface water runoff from the area to be affected. A box cut open pit is initially excavated to allow mining equipment access to the coal to be recovered. Overburden material from subsequent open pits is placed directly into the previously developed adjacent open pit by cast blasting, dozing or hauling with mobile equipment. The pits advance through the permitted project area until all recoverable coal has been uncovered and recovered. The recovery of as many as five different coal seams can be accomplished in one pit, with different seams blended to meet contract specifications; this gives the applicant the ability to adjust coal quality to suit the needs of different facilities. Mining will begin in the northern section of the permit boundary as the pit from the adjacent mine advances. As mining progresses, the overburden material placed in open pits where coal has been removed is graded to approximate original premining contour by dozers and other units of mobile equipment. As mining begins at the site, employees and equipment will be moved to the Joes Run South Mine and production will increase as needed. Once final reclamation grade is established, topsoil is distributed over the area and liming, fertilizing, seeding, and mulching activities are completed. Once vegetation cover is established to stabilize the individual reclaimed watersheds, final stream channels, hydraulic structures, and riparian zones are established.

Surface mining activities will begin at the northernmost point of the permit area, as the adjacent Joes Run Mine advances, and proceed to the southwest. Site preparation is scheduled to begin in 2019, with mining expected to begin in the same year and continue until 2024; reclamation activities are then expected to continue through 2025.

Impacts: The preferred alternative would impact approximately 199 acres of land surface. Within this area, 9 stream reaches would be impacted, totaling 9,563.9 linear feet and one open water pond totaling 1.03 acres.

Benefits: Meets project plan and purpose, allowing extraction of 750,000 million tons of coal, which will produce approximately 1.35 billion kWh of energy for the regional power grid. Operation

of facility will create a number of high-paying jobs, as well as maintain employment of several others.

Criteria for Exclusion: Significant disturbance of land surface and impacts to aquatic resources.

Table 1. Approximate Impacts to Streams

Stream Type	Number Affected	Length Affected (feet)
Ephemeral	7	5,479.7
Intermittent	2	4,084.2
Perennial	0	0
	Total:	9,563.9

Table 2. Impacts to Open Waters

Type	Number Affected*	Acreage Affected
Open Water	1	1.03
	Total:	1.03

The preferred Joes Run South alternate was selected to maximize coal extraction efficiency while minimizing impacts to jurisdictional Waters of the U.S. Underlying geology makes it economically viable to construct the mining facility at the proposed location. In addition to geological advantages, the land and mineral rights were available for purchase, making the proposed site most viable of the locations considered. Impacts were generally similar for alternate facility locations examined, however, the proposed site was most advantageous because it would be adjacent to existing mining operations and processing facility and will utilize the existing infrastructure.

Streams that will be impacted on site will potentially receive significant ecological lift over existing conditions by reclamation to current regulatory standards and mitigation and restoration efforts within the project area. Most project area streams exhibit significant manipulation from previous land uses (*e.g.* agriculture and logging); restored channels will reflect stable, geomorphically correct streams for the proposed post-mining landforms and hydrologic conditions.

The Joes Run South site is able to transport coal in the most environmentally, socially, and economically responsible manner. Public safety will be protected by minimizing heavy vehicle traffic on county roads, thereby limiting automobile encounters with coal trucks. In addition, fugitive dust, noise and exhaust emissions associated with coal truck traffic will be reduced below *de minimis* levels in areas used by the general public. In addition, short-distance use of public roads also avoids the introduction of these potential pollutants to new geographic areas.

Coal recovery at the Joes Run South mine, and its delivery to the marketplace, will have significant economic benefits. The local economy would retain high-quality employment for at least 5 years at the mine; it is anticipated that around 47 persons will be directly employed with an average salary of $60,000. The facility will also ensure the continued employment of 14 positions at the existing barge loading facility, trucker positions for transport, and employees at the test laboratory. The mine would continue to significantly raise the per capita and household income, and the state and county stand to gain $3.3 million in coal severance taxes and $400,000 in property and income taxes over the mining phase the project. Finally, the applicant has existing contracts with Owensboro Municipal Utilities; electric power customers potentially face an increase in rates if these providers must find alternate sources of coal.

Nationally, coal represents 21% of the energy supply and is used to produce 30% of our electricity. Approximately 83% of the Kentucky's electricity comes from coal fired plants, and over 50% of the coal comes from western Kentucky. Given a yield of 1,814 kWh per ton for coal, the Joes Run South Mine will produce approximately 1.35 billion kWh of electric power over its lifespan.

Overall, the proposed facility location and mine method is believed to be the least environmentally invasive option resulting in the most cost-effective recovery of the natural resource. The facility will accomplish this while maximizing public safety and minimizing its environmental footprint.